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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GOLUB, MARCIA A

ART UNIT

PAPER NUMBER

2828

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/802,734	<b>Applicant(s)</b> BEHFAR ET AL.	
	<b>Examiner</b> MARCIA A. GOLUB	<b>Art Unit</b> 2828	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 and 13-47 is/are pending in the application.
- 4a) Of the above claim(s) 2,4,5,7-10,13-24,27-30 and 33-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,6,25,26,31 and 32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments have been considered but they are not persuasive.

Regarding applicant's argument that paragraph 0009 of the specification provides support for features not shown in the elected embodiment of Fig 7b, the examiner points out that this paragraph appears in the summary of the invention and is directed to all the embodiments disclosed in the specification.

Regarding applicant's argument that paragraph 0037 of the specification provides support for features not shown in the elected Fig 7b, the examiner points out that this paragraph is directed towards several different embodiments, the embodiment of Fig 7b does not show a photonic device coupled to the laser with facets cut at a Brewster angle.

Regarding applicant's argument that Fig 6 is not limited to a specific embodiment but applies to all embodiments, the examiner points out that such argument should have been presented in a reply to a restriction requirement that indicated Fig 6 to be one of the species. Also, the specification makes it clear that Figs. 1-6 are directed to a different embodiment from Fig 7.

Regarding applicant's argument that specific cavity length disclosed in paragraph 0027 is not limited to a specific embodiment but applies to all embodiments, the examiner points out that this paragraph is directed towards a ring laser embodiment. Also, paragraph 0035 states that in the embodiment of Fig 7 the ring laser shown in Figs. 1-6 is replaced with a v-shaped laser, therefore the limitations directed to a ring shaped cavity cannot be carried over to a v-shaped laser. Ring shaped lasers have an extra leg and therefore are longer than the v-shaped lasers, therefore the length range appropriate for one type would not be appropriate for the other type of laser.

Accordingly, since the claims 2, 4, 7-9, 13-24, 27, 42-47 do read on the elected embodiment of Fig 7b they are withdrawn from consideration. The detailed description of the reasons was presented in the previous office action.

Regarding applicant's argument that the definition of the term "monolithic" may include the several semiconductor devices formed on a single substrate, the examiner

agrees with this definition. However, claim 1 described a “monolithic laser cavity” with a gap extending through it. Assuming that the device, as a whole, can be called monolithic since all the components are integrated on a single substrate, still, the cavity itself is separated into two parts by the gap and therefore cannot be called monolithic. Fig 7 shows a gap going all the way through the cavity, it does not show partially separated cavity. Also, the laser disclosed by the applicant is a semiconductor laser formed by epitaxial deposition, as confirmed by applicant on page 14 or the reply. Under no interpretation of the term “monolithic” can a device formed out of several layers be considered monolithic. The applicant’s own citation of the dictionary includes: “cast as a single piece” and “composed of material without joints or seams.”

For these reasons, the examiner still maintains that the term monolithic is incorrectly used to describe the semiconductor laser cavity separated by a gap.

Regarding applicant’s argument that the ‘029 reference does not disclose a monolithic semiconductor laser cavity, since the device is formed by wafer fusion or bonding of two structures. With all due respect, the applicant is now traversing the exact point he was defending on a previous page. The applicant cannot have his cake and eat it too! The device disclosed in ‘029 is not monolithic according to any reasonable interpretation, and neither is the laser cavity disclosed by the applicant. Since the claim is also rejected under 112 2<sup>nd</sup>, the examiner excluded the word monolithic from the limitations of the claim, therefore this limitation is not addressed. If the applicant insists on calling the laser cavity of his invention “monolithic” he should then accept the prior art reference disclosing a laser that meets applicant’s definition of the term. Also, ‘029 discloses the laser formed on a “monolithic” substrate, which, according to the applicant, qualifies the laser on top of the substrate to be also called monolithic.

Regarding applicant’s argument that claim 1 is not a product by process claim, since it is not in the form “gap made by the process comprising the step of etching”. The examiner points out that the form “etched gap” is equivalent in its meaning and substance to the more elaborate form cited by applicant. Furthermore, there is no standard form that must be used in order to make the claim a “true” product-by-process claim.

Regarding applicant's argument that the term "etched" should not be considered as a product-by-process term, since only etching can achieve the described structure. The examiner disagrees with this statement for the following reasons: no specific characteristics attributable to etching are listed in the claim; cleaving and etching are not the only two options available to make a gap, the gap can be made by not forming an undesirable part of the device in the first place; the applicant did not present any evidence that would show that etching would produce a substantially different product. The burden has been shifted to the applicant to show an unobvious difference.

Regarding applicant's argument that '983 discloses a gap between two distinct ring lasers and is not through a semiconductor waveguide cavity. The examiner points out that the location of the gap is not specified by the claim, therefore the gap can be located at the edge of the segment, especially since the claim does not specify which elements the gap is separating. As can be seen in the figure, the gap is separating different segments.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1, 3, 6, 25, 26, 31 and 32** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims recite a monolithic segment with an etched gap extending through the segment. According to a dictionary definition of the term (cast as a single piece, composed without joints or seams, formed from a single crystal), an element that is divided by a gap cannot be monolithic. As best interpreted by the examiner the claims recite "a semiconductor laser cavity...". Furthermore, the description of the laser cavity is contradictory to applicant's own description. In the U.S. Pat. 6,680,961 incorporated by reference the semiconductor laser is described as being composed of several layers and it does not disclose a laser cut out from a single crystal.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 1, 3 and 25** are rejected under 35 U.S.C. 102(e) as being anticipated by Sirbu et al. (6,546,029), hereinafter '029.

Fig 3 of '029 discloses a semiconductor laser, comprising:

1. “a semiconductor laser cavity [100] having at least one segment and at least one output;

at least one etched gap [16] extending through said at least one segment;  
 (“etched” is a product by process limitation that does not have a patentable weight in a device claim, same reasoning applies to other claims)

and at least one distributed Bragg reflector (DBR) [12a] at said at least one output.

3. “wherein said at least one laser cavity segment [100] includes an active region [27] and said gap [16] comprises spaced-apart facets extending through said active region, (facet is defined as a small plane surface and therefore meets the limitation of the claim)

and wherein said gap has a length of between about 0.001 um and about 10 um [1.5 um].” (4/56)

25. “a semiconductor waveguide cavity [100];

an etched gap [16] extending through said semiconductor waveguide cavity, said etched gap comprising a pair of parallel etched facets [defined by layers 18 and 34] spaced apart by a length of between about 0.001 um and 10 um [1.5 um].” (4/56)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 6, 25, 26, 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Belfar-Rad (5,132,983) hereinafter '983, and further in view of Evans et al. (4,952,019) hereinafter '019.

Fig 16 of '983 discloses:

1. "a semiconductor laser cavity having at least one segment [70] and at least one output [73];

at least one etched gap [space between 73 and 34] extending through said at least one segment; ("etched" is a product by process limitation that does not have a patentable weight in a device claim, same reasoning applies to other claims)

'983 discloses a reflector at the output face but does not disclose:

"at least one distributed Bragg reflector (DBR) at said at least one output."

However DBRs are well known in the art as evidenced by Fig 1 of '019.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of '019 into the device of '983 by making the reflector at the output face a DBR for at least the purpose of providing wavelength selective feedback into the laser cavity.

6. "wherein the laser cavity includes two segments [70, 10] joined at an etched output facet, said at least one etched gap in at least one segment providing improved unidirectionality." (9/51-55)

Fig 16 of '983 and Fig 1 of '019 discloses a semiconductor device comprising:

25. "a semiconductor waveguide cavity [280];

an etched gap [space between 190 and 192] extending through said semiconductor waveguide cavity, said etched gap comprising a pair of parallel etched

facets spaced apart by a length [d].” ‘983 does not disclose the length d to be “between about 0.001 um and 10 um.” However, ‘983 discloses adjusting the length of the gap in order to improve operation in a counterclockwise direction. (9/51-55)

It would have been obvious to one of ordinary skill in the art to find the optimum length for the gap, since the courts have held that optimization of range is not inventive unless it is accompanied by unexpected results, see MPEP 2144.05

26. “further including multiple etched gaps spaced along said waveguide cavity.”

31. “a semiconductor laser cavity [280] having multiple segments [180] joined end-to-end at an etched facet to provide a laser output;

and at least one etched gap [190, 192] extending through at least one segment.

32. “further including a DBR [14] located externally of said laser cavity and adjacent said output etched facet.”

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Contact Info***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2828

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/MAG/

/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828